

# LATHAM & WATKINS LLP

February 5, 2018

## **VIA ELECTRONIC FILING**

Ms. Marlene H. Dortch  
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Federal Communications Commission  
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Re: Viasat, Inc., Notice of *Ex Parte* Presentation, IB Docket Nos. 16-408 & 17-95

Dear Ms. Dortch:

On February 2, 2018, Chris Murphy and Daryl Hunter of Viasat, Inc. (“Viasat”), and the undersigned, met with Jose Albuquerque, Karl Kensinger, Chip Fleming, Cindy Spiers and Paul Blais of the International Bureau to discuss the above-referenced proceedings. Stephen Duall of the International Bureau and Chris Hofer of Viasat participated via teleconference. The attached presentation formed the basis for the discussion.

If you have any questions regarding this submission, please contact the undersigned.

Respectfully submitted,

/s/

John P. Janka  
Elizabeth R. Park

cc: Jose Albuquerque  
Paul Blais  
Stephen Duall  
Chip Fleming  
Karl Kensinger  
Cindy Spiers

# Pending FCC Rulemakings

February 1, 2018



# ESIM Rulemaking

- Viasat supports proposed ESIM rules, including access to the 29.25-29.3 GHz band
- Use of this band, and matching downlink, would allow use of 250 MHz and larger contiguous channels without fragmenting carriers to smaller values
- Viasat has updated its sharing analysis to use typical ESIM duty cycles and to use a 160 MBd return link carrier. Results demonstrate that use of this band by ESIMs is compatible with MSS Feeder Link operations even in close proximity to gateways. I/N is less than -12.2 for 99.999749% of time. Only exceeds -12.2 dB I/N for 16 seconds over 90 days for an average of 1 second per event. Worst case I/N is 1.43 dB
- Analysis uses HIBLEO-2FL notified characteristics and those of Viasat's E180006 ESIM license application
- Visualyse simulation uses 6 ESIMs flying past Iridium gateway 7/24 for 90 days with no exclusion zone. Use of 6 ESIMs is appropriate as only one ESIM transmits at a time in any given beam due to use of MF-TDMA

# ESIM Rulemaking

- For over 20 years Commission rules have contemplated sharing between MSS Feeder Links and GSO user terminals, and which have been sharing successfully for years.
- ESIM sharing with fixed earth stations is feasible.
  - Viasat coordinated ESIMs with NASA over a decade ago and they have been operating around the White Sands TDRSS site with no interference
- Viasat built the Iridium gateway earth stations – we know how to track NGSO satellites. Orbital propagation software is also built into each ESIM antenna control unit and ESIMs are location aware.
  - ESIMs know where they are, and where/when to adjust their operations. NMS monitors location and status of stations at all times, no matter where they are

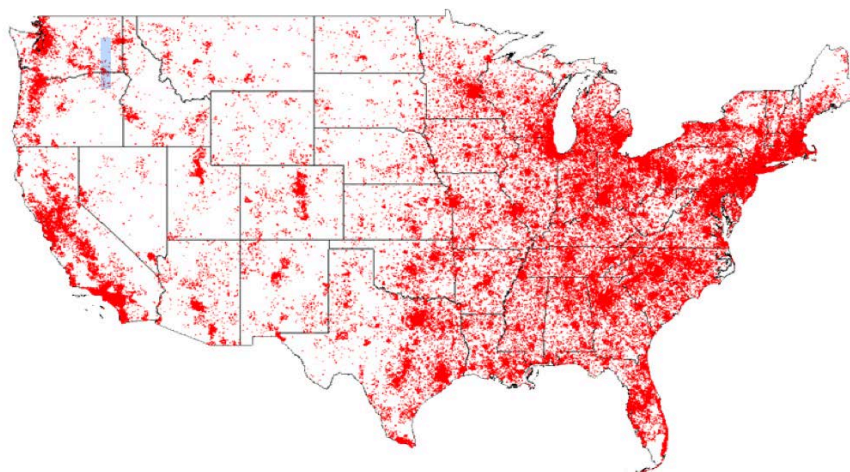
# ESIM Rulemaking

- Viasat's technical analyses both domestically and internationally are consistent with Viasat's earth station characteristics.
  - Viasat employs multiple satellite access technologies. Characteristics, e.g., modulation and coding waveforms, e.i.r.p. density, vary, but each of these technologies can share with Iridium
  - Most common are MF-TDMA waveforms. Our latest waveform uses much higher symbol rates, which require a higher peak e.i.r.p. during bursts. However, these higher symbol rates result in both lower e.i.r.p. density and in lower duty cycles per terminal
- Iridium's claim that GSOs do not need access to the 50 MHz of shared spectrum ignores that access to this band allows GSO operators to use a 250 MHz or 500 MHz contiguous channel which otherwise would not be possible
  - The spot beam nature of VHTS satellites also allows this spectrum to be reused many times over across the satellite's coverage area.

# ESIM Rulemaking

- > GSA OOBE Concerns – ESIMs are required to meet the same 25.202(f) OOBE mask met today by millions of authorized fixed earth stations. These limits are adequate given state of today's RF environment and receiver designs.

Figure 1. ViaSat Broadband Subscriber Density



- > Approximately 700,000 Viasat earth stations are currently deployed US wide

# ESIM Rulemaking

- > As recognized by FCC, earth stations on aircraft are ESIMs when in motion, and temporary-fixed earth stations when stationary
- > Fixed earth stations operating under blanket license are deployed ubiquitously throughout the US, including airports where they provide WiFi in airport terminals
- > Millions of FSS earth stations have been authorized in bands adjacent to FS stations for decades without OOB issues
- > Expressed concerns about ESIM OOBs suggest that 5G equipment is being designed to be incompatible with existing FSS earth stations - which have been operating in the band for decades. Viasat ESIMs use same modem as Viasat's fixed FSS earth stations

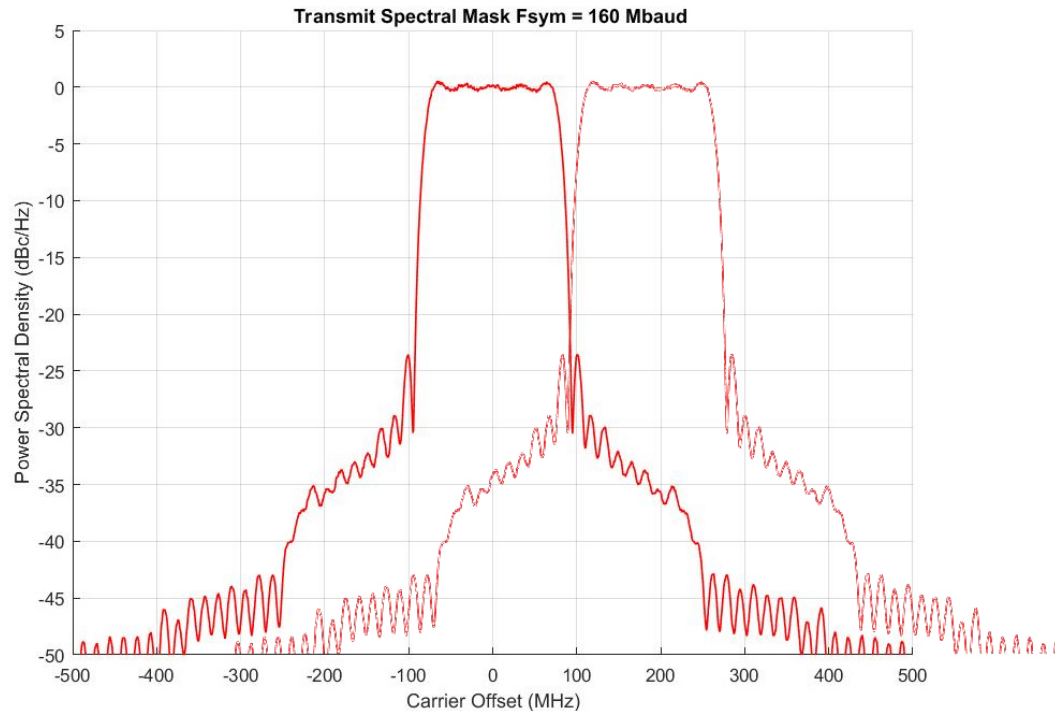
# ESIM Rulemaking

- Modern satellite networks use channel spacing of 1.3 to 1.125 times the symbol rate depending upon vendor and vintage
- For example, two 160 MBd carriers in a satellite network can have center frequencies as little as 180 MHz apart. OOB emissions meet FCC limits and satellite modem receiver design works even though the carriers are right next to each other and overlapping some adjacent carrier OOBE
  - See modulator output spectrum and spectrum analyzer plots
  - Figure 2, typical simulated modem output and channel spacing shown
  - Figure 3, spectrum analyzer plot of 150 MHz of operational ViaSat-1 return link downlink beam showing mix of 625 kBd, 1.25 MBd, 2.5 MBd, 5 MBd, and 10 MBd carriers



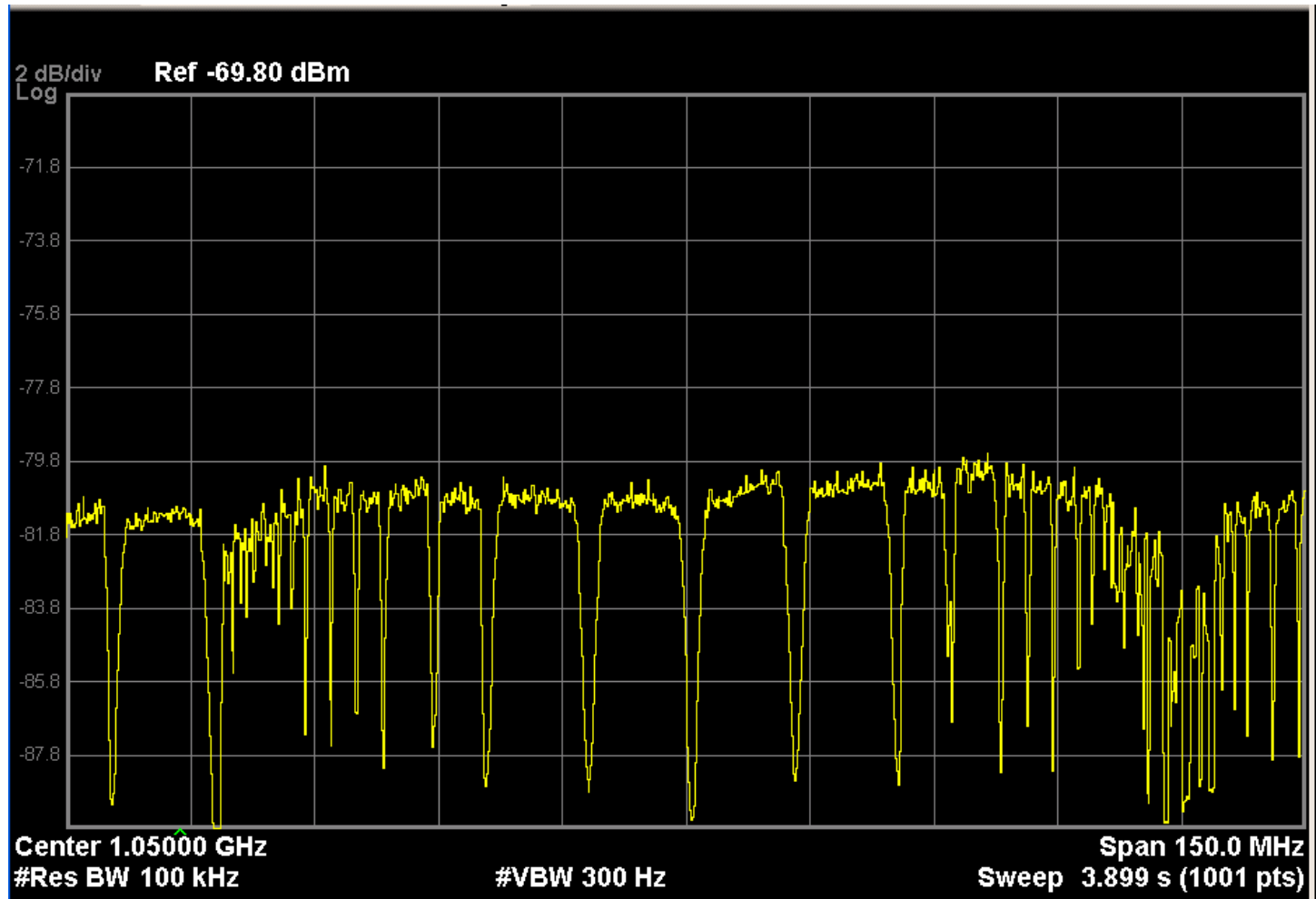
# Figure 2

## Typical Modem Output and Channel Spacing



# Figure 3

## ViaSat-1 Example Return Link Spectrum Plot



# ESIM Rulemaking

- > In contrast to efficient bandwidth utilization of satellite, GSA plan to deploy receivers that need 400 MHz channel spacing for 200 MHz wide carriers, i.e., 2.0 times symbol rate (Note 2, Attachment 2 of WP5D Liaison Statement to TG 5/1). This either means that their receivers have poor selectivity or, they are trying to work around their own poor transmit OOB characteristics
- > 5G receiver designers have a responsibility to design equipment to be compatible with equipment that has been operating for years

# NGSO Ka/Ku Rulemaking Reconsideration

## > EPFD Limits

- > Aggregate EPFDup limits are needed to protect modern GSO VHTS satellite receivers. These satellites have higher receive antenna gains and lower receiver noise temperatures than satellites considered when single entry EPFDup limits were established long ago
- > Newer VHTS satellites with smaller spot beams (larger antennas with more gain) offer higher levels of frequency reuse than previously possible and are vastly more spectrally efficient than previous satellite designs
- > US rejected efforts to reopen EPFDup limits during this ITU study cycle
- > Single entry EPFDup limits are under protective of VHTS satellite receivers, and multiple entry aggregate interference can cause significant throughput reduction for those beams affected

# NGSO Ka/Ku Rulemaking Reconsideration

- 19.4-19.6/29.1-29.25 GHz Spectrum Access
  - Viasat requested reconsideration of the Commission's decision that consideration of these frequency bands falls outside of the present rulemaking
  - The NPRM expressly invited proposals regarding sharing in the Ka band and referenced underutilized NGSO MSS feeder link spectrum
  - No valid technical justification for not sharing. As the ESIMs proceeding shows, sharing is possible
    - Viasat analysis in ESIMs proceeding shows that GSO operations are possible and MSS FL can be protected without the need for coordination. Sharing should be allowed, provided that proper technical showing is made

# NGSO Ka/Ku RM Recon (Continued)

- NGSO Application Amendment Process
  - Viasat followed the pre-*NGSO Order* rules for system design
  - Global coverage requirement was eliminated and milestone/buildout requirements were relaxed in the *Order*
  - Inequitable to allow nonconforming systems to avoid previous rules but not provide a clear path for changes to compliant systems
  - Should clarify how and when pending applications can be amended to factor in flexibility provided by new rules
  - For example, issue Public Notice clarifying these matters